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09/434,338	11/04/1999	JAMES V. LUCIANI	2204/149	3834

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/434,338	Applicant(s) LUCIANI ET AL.	
	Examiner Christian La Forgia	Art Unit 2155	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 January 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-60* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 November 1999* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1 through 60 are presented for examination.

Drawings

2. The drawings are objected to because the lines, characters and numbers are not of uniform thickness. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 through 14 and 53 through 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,079,020 to Liu, (hereinafter Liu), in view of United States Patent No. 6,374,303 to Armitage et al., (hereinafter Armitage).

5. As per claim 1, Liu teaches a method for supporting virtual private networks in a label switched communication system having an ingress device in communication with an egress device via a number of intermediate devices, the method comprising:

6. including label information and a virtual private network identifier in Next Hop Resolution Protocol messages, the virtual private network identifier identifying a virtual private network (Figures 1, 2, 3, 6, 8, & 9; column 7, lines 8-40; column 9, lines 28-58).

7. Liu does not teach using the Next Hop Resolution Protocol messages to dynamically establish a label switched path for the virtual private network.

8. Armitage teaches using the Next Hop Resolution Protocol messages to dynamically establish a label switched path for the virtual private network (Figures 1, 2, 3, 4, 5, & 6; Abstract; column 7, line 55 to column 8, line 32). Therefore it would be obvious to one with ordinary skill in the art at the time the invention was made to include the Next Hop Resolution Protocol messages of Armitage with the system of Liu, because it resolves a routing solution quicker.

9. Regarding claim 2, Liu does not teach the label information and the virtual private network identifier is included within a Next Hop Resolution Protocol message in a type-length-value field having at least a virtual private network identifier field for carrying the virtual private network identifier and a label information field for carrying the label information.

10. Armitage teaches the label information and the virtual private network identifier is included within a Next Hop Resolution Protocol message in a type-length-value field having at least a virtual private network identifier field for carrying the virtual private network identifier and a label information field for carrying the label information (Figures 6, 10, & 11; column 5, lines 5-47; column 6, line 60 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the label information and VPN identifier fields of Armitage with the system of Liu, because it would hasten the speed in which a path through the network would be resolved.

11. Regarding claim 3, Liu does not teach the Next Hop Resolution Protocol messages to dynamically establish a label switched path for the virtual private network comprises using the Next Hop Resolution Protocol messages to dynamically establish a label switched path for a forward path from the ingress device to the egress device for the virtual private network.

12. Armitage teaches the Next Hop Resolution Protocol messages to dynamically establish a label switched path for the virtual private network comprises using the Next Hop Resolution Protocol messages to dynamically establish a label switched path for a forward path from the ingress device to the egress device for the virtual private network (Figures 9A & 9D; column 6, lines 32-59). It would have been obvious to one with ordinary skill in the art at the time the invention was made to incorporate the forwarding of Armitage with the system of Liu, because it would hasten the speed in which a path through the network would be resolved.

13. As per claim 4, Liu does not teach using the Next Hop Resolution Protocol messages to dynamically establish the label switched path for the forward path from the ingress device to the egress device for the virtual private network comprises:

14. sending a Next Hop Resolution Protocol request message by the ingress device;

15. forwarding the Next Hop Resolution Protocol request message hop-by-hop from the ingress device to the egress device by each intermediate device that is on the forward path;

16. sending a Next Hop Resolution Protocol reply message by the egress device; and

17. forwarding the Next Hop Resolution Protocol reply message hop-by-hop from the egress device to the ingress device by each intermediate device that is on the forward path.

18. Armitage teaches using the Next Hop Resolution Protocol messages to dynamically establish the label switched path for the forward path from the ingress device to the egress device for the virtual private network comprises:

19. sending a Next Hop Resolution Protocol request message by the ingress device (Figures 2 & 10; column 2, lines 20-60; column 6, line 60 to column 7, line 35);

20. forwarding the Next Hop Resolution Protocol request message hop-by-hop from the ingress device to the egress device by each intermediate device that is on the forward path (Figure 10; column 6, line 60 to column 7, line 35);

21. sending a Next Hop Resolution Protocol reply message by the egress device (Figures 3 & 11; column 2, line 60 to column 3, line 15; column 7, lines 35-55); and

22. forwarding the Next Hop Resolution Protocol reply message hop-by-hop from the egress device to the ingress device by each intermediate device that is on the forward path (Figure 11; column 7, lines 35-55). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the method of Armitage with the system of Liu, because it would establish alternative methods to navigate a network from beginning to end.

23. Regarding claim 5, Liu does not teach the Next Hop Resolution Protocol request message is a Next Hop Resolution Protocol Resolution Request message, and wherein the label information comprises a label request.

24. Armitage teaches the Next Hop Resolution Protocol request message is a Next Hop Resolution Protocol Resolution Request message, and wherein the label information comprises a label request (Figures 14A & 14B; column 8, lines 32-60). Therefore, it would have been

obvious to one with ordinary skill in the art at the time the invention was made to include the label information request of Armitage with the system of Liu, because it would hasten the speed in which a path through the network would be resolved.

25. Concerning claim 6, Liu does not teach the Next Hop Resolution Protocol reply message is a Next Hop Resolution Protocol Resolution Reply message, and wherein the label information comprises label mapping information.

26. Armitage teaches the Next Hop Resolution Protocol reply message is a Next Hop Resolution Protocol Resolution Reply message, and wherein the label information comprises label mapping information (Figures 10, 11, & 12; column 6, line 60 to column 7, line 35). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to include the label information request of Armitage with the system of Liu, because it would hasten the speed in which a path through the network would be resolved.

27. As per claim 7, Liu does not teach the Next Hop Resolution Protocol reply message is a Next Hop Resolution Protocol Label Mapping message, and wherein the label information comprises label mapping information.

28. Armitage teaches the Next Hop Resolution Protocol reply message is a Next Hop Resolution Protocol Label Mapping message, and wherein the label information comprises label mapping information (Figures 10, 11, & 12; column 6, line 60 to column 8, line 13). Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was

made to include the label information request of Armitage with the system of Liu, because it would hasten the speed in which a path through the network would be resolved.

29. With regards to claim 8, Liu does not teach the Next Hop Resolution Protocol request message by an intermediate device comprises:

30. receiving the Next Hop Resolution Protocol request message from a previous hop device on the forward path;

31. maintaining previous hop state information for the previous hop device; and,

32. forwarding the Next Hop Resolution Protocol request message to a next hop device on the forward path.

33. Armitage teaches the Next Hop Resolution Protocol request message by an intermediate device comprises:

34. receiving the Next Hop Resolution Protocol request message from a previous hop device on the forward path (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54);

35. maintaining previous hop state information for the previous hop device (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54); and,

36. forwarding the Next Hop Resolution Protocol request message to a next hop device on the forward path (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the hop-by-hop information of Armitage with the system of Liu, because it would hasten the speed in which a path through the network would be resolved.

37. Regarding claim 9, Liu does not teach forwarding the Next Hop Resolution Protocol reply message by an intermediate device comprises:

38. receiving a first Next Hop Resolution Protocol reply message from a next hop device on the forward path;

39. allocating a forward path label for a label switched path segment from a previous hop device on the forward path to the intermediate device; and,

40. sending a second Next Hop Resolution Protocol reply message including the forward path label and the virtual private network identifier to the previous hop device on the forward path based upon the previous hop state information.

41. Armitage teaches forwarding the Next Hop Resolution Protocol reply message by an intermediate device comprises:

42. receiving a first Next Hop Resolution Protocol reply message from a next hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

43. allocating a forward path label for a label switched path segment from a previous hop device on the forward path to the intermediate device (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54); and,

44. sending a second Next Hop Resolution Protocol reply message including the forward path label and the virtual private network identifier to the previous hop device on the forward path based upon the previous hop state information (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the reply

information of Armitage with the system of Liu, because it would ensure that a path was resolved.

45. Regarding claim 10, Liu does not teach forwarding the Next Hop Resolution Protocol request message by an intermediate device comprise:

46. receiving the Next Hop Resolution Protocol request message from a previous hop device on the forward path, the Next Hop Resolution Protocol request message including a forward path address list;

47. adding an intermediate device address to the forward path address list in the Next Hop Resolution Protocol request message; and,

48. forwarding the Next Hop Resolution Protocol request message including the forward path address list to a next hop device on the forward path.

49. Armitage teaches forwarding the Next Hop Resolution Protocol request message by an intermediate device comprise:

50. receiving the Next Hop Resolution Protocol request message from a previous hop device on the forward path, the Next Hop Resolution Protocol request message including a forward path address list (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

51. adding an intermediate device address to the forward path address list in the Next Hop Resolution Protocol request message (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54); and,

52. forwarding the Next Hop Resolution Protocol request message including the forward path address list to a next hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the reply information of Armitage with the system of Liu, because it would ensure that a path was resolved.

53. As per claim 11, Liu does not teach the forward path address list comprises a Next Hop Resolution Protocol Forward Transit NHS Record Extension field.

54. Armitage teaches the forward path address list comprises a Next Hop Resolution Protocol Forward Transit NHS Record Extension field (Figures 10 & 11; column 6, line 60 to column 7, line 55). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the reply information of Armitage with the system of Liu, because it would ensure that a path was resolved and stored.

55. Regarding claim 12, Liu does not teach forwarding the Next Hop Resolution Protocol reply message by an intermediate device comprises:

56. receiving a first Next Hop Resolution Protocol reply message from a next hop device on the forward path, the Next Hop Resolution Protocol reply message including a return path address list including at least an address of a previous hop device on the forward path;

57. allocating a forward path label for a label switched path segment from a previous hop device on the forward path to the intermediate device; and,

58. sending a second Next Hop Resolution Protocol reply message including the forward path label and the virtual private network identifier to the previous hop device on the forward path based upon the address in the return path address list.

59. Armitage teaches forwarding the Next Hop Resolution Protocol reply message by an intermediate device comprises:

60. receiving a first Next Hop Resolution Protocol reply message from a next hop device on the forward path, the Next Hop Resolution Protocol reply message including a return path address list including at least an address of a previous hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

61. allocating a forward path label for a label switched path segment from a previous hop device on the forward path to the intermediate device (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54); and,

62. sending a second Next Hop Resolution Protocol reply message including the forward path label and the virtual private network identifier to the previous hop device on the forward path based upon the address in the return path address list (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the reply information of Armitage with the system of Liu, because it would ensure that a path was resolved.

63. As per claim 13, Liu does not teach sending a Next Hop Resolution Protocol reply message by the egress device:

64. receiving the Next Hop Resolution Protocol request message from a previous hop device on the forward path;

65. allocating a forward path label for a label switched path segment from the previous hop device on the forward path to the egress device; and,

66. sending the Next Hop Resolution Protocol reply message including the forward path label and the virtual private network identifier to the previous hop device on the forward path.

67. Armitage teaches sending a Next Hop Resolution Protocol reply message by the egress device:

68. receiving the Next Hop Resolution Protocol request message from a previous hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

69. allocating a forward path label for a label switched path segment from the previous hop device on the forward path to the egress device (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54); and,

70. sending the Next Hop Resolution Protocol reply message including the forward path label and the virtual private network identifier to the previous hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Liu, because it would ensure that a path was resolved.

71. As per claim 14, Liu does not teach the Next Hop Resolution Protocol request message includes a forward path address list including at least an address of the previous hop device on the forward path, and wherein sending the Next Hop Resolution Protocol reply message to the previous hop device on the forward path comprises sending the Next Hop Resolution Protocol reply message to the previous hop device on the forward path based upon the address in the forward path address list.

72. Armitage teaches the Next Hop Resolution Protocol request message includes a forward path address list including at least an address of the previous hop device on the forward path, and wherein sending the Next Hop Resolution Protocol reply message to the previous hop device on the forward path comprises sending the Next Hop Resolution Protocol reply message to the previous hop device on the forward path based upon the address in the forward path address list (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would be obvious to one with ordinary skill in the art at the time the invention was made to include the reply of Armitage with the system of Liu, because it establishes the handshake required for network communication.

73. As per claim 53, Liu teaches a communication system comprising an ingress device in communication with an egress device via a number of intermediate devices (Figures 1 & 13; column 5, line 54 to column 6, line 36).

74. Liu does not teach wherein a label switched path is established for a virtual private network by including label information and a virtual private network identifier in Next Hop

Resolution Protocol messages and using the Next Hop Resolution Protocol messages to dynamically establish the label switched path for the virtual private network.

75. Armitage teaches wherein a label switched path is established for a virtual private network by including label information and a virtual private network identifier in Next Hop Resolution Protocol messages and using the Next Hop Resolution Protocol messages to dynamically establish the label switched path for the virtual private network (Figures 1, 2, 3, 4, 5, & 6; Abstract; column 7, line 55 to column 8, line 32). Therefore it would be obvious to one with ordinary skill in the art at the time the invention was made to include the Next Hop Resolution Protocol messages of Armitage with the system of Liu, because it resolves a quick and efficient method of navigating through a network.

76. Regarding claim 54, Liu does not teach wherein:

77. the ingress device sends a Next Hop Resolution Protocol request message including at least a label request and the virtual private network identifier to a next hop device on a forward path from the ingress device to the egress device;

78. each intermediate device on the forward path forwards the Next Hop Resolution Protocol request message to a next hop device on the forward path;

79. the egress device sends a Next Hop Resolution Protocol reply message including at least forward path label mapping information and the virtual private network identifier to a previous hop device on the forward path; and,

80. each intermediate device on the forward path forwards the Next Hop Resolution Protocol reply message to a previous hop device on the forward path.

81. Armitage teaches wherein:

82. the ingress device sends a Next Hop Resolution Protocol request message including at least a label request and the virtual private network identifier to a next hop device on a forward path from the ingress device to the egress device (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

83. each intermediate device on the forward path forwards the Next Hop Resolution Protocol request message to a next hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

84. the egress device sends a Next Hop Resolution Protocol reply message including at least forward path label mapping information and the virtual private network identifier to a previous hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54); and,

85. each intermediate device on the forward path forwards the Next Hop Resolution Protocol reply message to a previous hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). Therefore it would be obvious to one with ordinary skill in the art at the time the invention was made to include the method of Armitage with the system of Liu, because it resolves a routing solution quicker.

86. Regarding claim 55, Liu does not teach wherein the ingress device further includes return path label mapping information in the Next Hop Resolution Protocol request message, and

wherein each intermediate device on the forward path further includes return path label mapping information in the Next Hop Resolution Protocol request message.

87. Armitage teaches wherein the ingress device further includes return path label mapping information in the Next Hop Resolution Protocol request message, and wherein each intermediate device on the forward path further includes return path label mapping information in the Next Hop Resolution Protocol request message (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). Therefore it would be obvious to one with ordinary skill in the art at the time the invention was made to include the method of Armitage with the system of Liu, because it resolves a routing solution quicker.

88. Claims 15 through 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu in view of Armitage as applied to claim 1 above, and further in view of United States Patent No. 6,438,100 to Halpern et al., (hereinafter Halpern).

89. As per claim 15, Liu and Armitage do not teach the Next Hop Resolution Protocol messages to dynamically establish a label switched path for the virtual private network comprises using the Next Hop Resolution Protocol messages to dynamically establish a label switched path for a return path from the egress device to the ingress device for the virtual private network.

90. Halpern teaches the Next Hop Resolution Protocol messages to dynamically establish a label switched path for the virtual private network comprises using the Next Hop Resolution Protocol messages to dynamically establish a label switched path for a return path from the egress device to the ingress device for the virtual private network (Figure 1; column 6, lines 13-

40; column 10, lines 27-43). It would be obvious to one with ordinary skill in the art at the time the invention was made to include the method of Halpern with the system of Liu and Armitage, because it would offer another method to establish a path through the network.

91. As per claim 16, Armitage teaches using the Next Hop Resolution Protocol messages to dynamically establish the label switched path for the return path from the egress device to the ingress device for the virtual private network comprises:

92. sending a Next Hop Resolution Protocol request message by the ingress device (Figures 2 & 10; column 2, lines 20-60; column 6, line 60 to column 7, line 35); and,

93. forwarding the Next Hop Resolution Protocol request message hop-by-hop from the egress device to the ingress device by each intermediate device that is on the forward path (Figure 10; column 6, line 60 to column 7, line 35).

94. Regarding claim 17, Armitage teaches sending the Next Hop Resolution Protocol request message by the ingress device comprises:

95. allocating a return path label for a label switched path segment from a next hop device on the forward path to the ingress device (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54); and,

96. sending the Next Hop Resolution Protocol request message including the return path label and the virtual private network identifier to the next hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54).

97. Concerning claim 18, Armitage teaches forwarding the Next Hop Resolution Protocol request message by an intermediate device comprises:

98. receiving a first Next Hop Resolution Protocol request message from a previous hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

99. allocating a return path label for a label switched path segment from a next hop device on the forward path to an intermediate device (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54); and,

100. sending a second Next Hop Resolution Protocol request message including the return path label and the virtual private network identifier to the next hop device on the forward path (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54).

101. Claims 19, 20, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halpern in view of Liu.

102. As per claim 19, Halpern teaches a device for supporting virtual private networks in a label switched communication system, the device comprising:

103. label switching logic operably coupled to establish a label switched path for the virtual private network using Next Hop Resolution Protocol messages (Figure 1; column 6, lines 13-40; column 10, lines 27-43).

104. Halpern does not teach wherein the label switching logic includes a label request and a virtual private network identifier in Next Hop Resolution Protocol request messages; and,

105. wherein the label switching logic includes label mapping information and the virtual private network identifier in Next Hop Resolution Protocol reply messages.

106. Liu teaches wherein the label switching logic includes a label request and a virtual private network identifier in Next Hop Resolution Protocol request messages (Figures 2, 3, 6, 8, 9, & 11; column 7, lines 8-40; column 9, lines 28-58); and,

107. wherein the label switching logic includes label mapping information and the virtual private network identifier in Next Hop Resolution Protocol reply messages (Figures 2, 3, 5, 6, 8, 9, & 11; column 8, line 61 to column 9, line, 26). Therefore it would be obvious to one with ordinary skill in the art at the time the invention was made to include the identifiers of Liu with the device of Halpern, because it resolves a quick and efficient method of navigating through a network.

108. Concerning claim 20, Halpern does not teach transmitting logic operably coupled to transmit to a next hop device in the communication network a Next Hop Resolution Protocol request message including a label request and the virtual private network identifier; and,

109. receiving logic operably coupled to receive from the next hop device in the communication network a Next Hop Resolution Protocol reply message including a forward path label for a label switched path segment to the next hop device in the communication network and the virtual private network identifier.

110. Liu teaches transmitting logic operably coupled to transmit to a next hop device in the communication network a Next Hop Resolution Protocol request message including a label request and the virtual private network identifier (Figures 2, 3, 6, 8, 9, & 11; column 7, lines 8-40; column 9, lines 28-58); and,

receiving logic operably coupled to receive from the next hop device in the communication network a Next Hop Resolution Protocol reply message including a forward path label for a label switched path segment to the next hop device in the communication network and the virtual private network identifier (Figures 2, 3, 5, 6, 8, 9, & 11; column 8, line 61 to column 9, line, 26). It would be obvious to one with ordinary skill in the art at the time the invention was made to include the identifiers of Liu with the device of Halpern, because it resolves a quick and efficient method of navigating through a network.

111. As per claim 36, Halpern teaches a program product comprising a computer readable medium having embodied therein a computer program for supporting virtual private networks in a label switched communication system, the computer program comprising label switching logic programmed to establish a label switched path for the virtual private network using Next Hop Resolution Protocol messages (Figure 1; column 6, lines 13-40; column 10, lines 27-43).

112. Halpern does not teach wherein the label switching logic is programmed to include a label request and a virtual private network identifier in Next Hop Resolution Protocol request messages; and,

113. wherein the label switching logic is programmed to include label mapping information and the virtual private network identifier in Next Hop Resolution Protocol reply messages.

114. Liu teaches wherein the label switching logic is programmed to include a label request and a virtual private network identifier in Next Hop Resolution Protocol request messages (Figures 2, 3, 6, 8, 9, & 11; column 7, lines 8-40; column 9, lines 28-58); and,

115. wherein the label switching logic is programmed to include label mapping information and the virtual private network identifier in Next Hop Resolution Protocol reply messages (Figures 2, 3, 5, 6, 8, 9, & 11; column 8, line 61 to column 9, line, 26). Therefore it would be obvious to one with ordinary skill in the art at the time the invention was made to include the identifiers of Liu with the device of Halpern, because it resolves a quick and efficient method of navigating through a network.

116. Claim 37 is rejected for similar reasons as stated above.

117. Claims 21 through 35 and 38 through 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halpern in view of Liu as applied to claim 20 above, and further in view of Armitage.

118. Regarding claim 21, Liu and Halpern do not teach the label switching logic is operably coupled to establish the label switched path to the next hop device in the communication network using the forward path label.

119. Armitage teaches the label switching logic is operably coupled to establish the label switched path to the next hop device in the communication network using the forward path label (Figures 10 & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication

method of Armitage with the system of Halpern and Liu, because it would ensure that a path was resolved.

120. As per claim 22, Liu and Halpern do not teach the label switching logic further comprises return path allocation logic operably coupled to allocate a return path label for a label switched path segment from the next hop device in the communication network, and wherein the transmitting logic is operably coupled to transmit to the next hop device in the communication network the Next Hop Resolution Protocol request message including the return path label in addition to the label request and the virtual private network identifier.

121. Armitage teaches the label switching logic further comprises return path allocation logic operably coupled to allocate a return path label for a label switched path segment from the next hop device in the communication network, and wherein the transmitting logic is operably coupled to transmit to the next hop device in the communication network the Next Hop Resolution Protocol request message including the return path label in addition to the label request and the virtual private network identifier (Figures 10 & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Halpern and Liu, because it would ensure that a path through the network was resolved.

122. Regarding claim 23, Liu and Halpern do not teach the label switching logic comprises:

123. request message receiving logic operably coupled to receive from a previous hop device in the communication network a first Next Hop Resolution Protocol request message including a label request and the virtual private network identifer;

124. request message transmitting logic operably coupled to transmit to a next hop device in the communication network a second Next Hop Resolution Protocol request message including the label request and the virtual private network identifier;

125. reply message receiving logic operably coupled to receive from the next hop device in the communication network a first Next Hop Resolution Protocol reply message including label mapping information and the virtual private network identifier;

126. forward path label allocation logic operably coupled to allocate a forward path label for a label switched path segment from the previous hop device in the communication network; and,

127. reply message transmitting logic operably coupled to transmit to the previous hop device in the communication network a second Next Hop Resolution Protocol reply message including the forwad path label and the virtual private network identifier.

128. Armitage teaches the label switching logic comprises:

129. request message receiving logic operably coupled to receive from a previous hop device in the communication network a first Next Hop Resolution Protocol request message including a label request and the virtual private network identifer (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

130. request message transmitting logic operably coupled to transmit to a next hop device in the communication network a second Next Hop Resolution Protocol request message including

the label request and the virtual private network identifier (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

131. reply message receiving logic operably coupled to receive from the next hop device in the communication network a first Next Hop Resolution Protocol reply message including label mapping information and the virtual private network identifier (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

132. forward path label allocation logic operably coupled to allocate a forward path label for a label switched path segment from the previous hop device in the communication network (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54); and,

133. reply message transmitting logic operably coupled to transmit to the previous hop device in the communication network a second Next Hop Resolution Protocol reply message including the forwad path label and the virtual private network identifier (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Halpern and Liu, because it would establish the handshake needed for network communication.

134. As per claim 24, Liu nor Halpern teach the request message receiving logic is operably coupled to maintain previous hop state information for the previous hop device in the communication network, and wherein the reply message transmitting logic is operably coupled

to transmit the second Next Hop Resolution Protocol reply message to the previous hop device in the communication network based upon the previous hop state information.

135. Armitage teaches the request message receiving logic is operably coupled to maintain previous hop state information for the previous hop device in the communication network, and wherein the reply message transmitting logic is operably coupled to transmit the second Next Hop Resolution Protocol reply message to the previous hop device in the communication network based upon the previous hop state information (Figures 10 & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Halpern and Liu, because it would establish the handshake needed for network communication.

136. Regarding claim 25, Liu nor Halpern teach the first Next Hop Resolution Protocol request message includes a forward path address list, and wherein the label switching logic is operably coupled to insert a device address into the forward path address list and include the forward path address list in the second Next Hop Resolution Protocol request message.

137. Armitage teaches the first Next Hop Resolution Protocol request message includes a forward path address list, and wherein the label switching logic is operably coupled to insert a device address into the forward path address list and include the forward path address list in the second Next Hop Resolution Protocol request message (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the

communication method of Armitage with the system of Halpern and Liu, because it would establish the handshake needed for network communication.

138. As per claim 26, Liu and Halpern do not teach the forward path address list comprises a Next Hop Resolution Protocol Forward Transit NHS Record Extension field.

139. Armitage teaches the forward path address list comprises a Next Hop Resolution Protocol Forward Transit NHS Record Extension field (Figures 10 & 11; column 6, line 60 to column 7, line 55). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the reply information of Armitage with the system of Liu and Halpern, because it would ensure that a path was resolved and stored.

140. Regarding claim 27, neither Liu or Halpern teach the first Next Hop Resolution Protocol reply message includes a return path address list including at least an address for the previous hop device in the communication network, and wherein the reply message transmitting logic is operably coupled to transmit the second Next Hop Resolution Protocol reply message to the previous hop device in the communication network based upon address in the list of addresses.

141. Armitage teaches the first Next Hop Resolution Protocol reply message includes a return path address list including at least an address for the previous hop device in the communication network, and wherein the reply message transmitting logic is operably coupled to transmit the second Next Hop Resolution Protocol reply message to the previous hop device in the communication network based upon address in the list of addresses (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would

have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Halpern and Liu, because it is an essential step in establishing the handshake needed for network communication.

142. Regarding claim 28, Liu nor Halpern teach the reply message transmitting logic is operably coupled to remove an address from the return path address list to form a modified return path address list and to include the modified return path address list in the second Next Hop Resolution Protocol reply message.

143. Armitage teaches the reply message transmitting logic is operably coupled to remove an address from the return path address list to form a modified return path address list and to include the modified return path address list in the second Next Hop Resolution Protocol reply message (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Halpern and Liu, because it is an essential step in establishing the handshake needed for network communication.

144. Concerning claim 29, Liu nor Halpern teach the first Next Hop Resolution Protocol request message includes a return path label for a label switched path segment to the previous hop device, and wherein the label switching logic is operably coupled to establish a label switched path to the previous hop device using the return path label.

145. Armitage teaches the first Next Hop Resolution Protocol request message includes a return path label for a label switched path segment to the previous hop device, and wherein the label switching logic is operably coupled to establish a label switched path to the previous hop device using the return path label (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Halpern and Liu, because it is an essential step in establishing the handshake needed for network communication.

146. As per claim 30, Liu and Halpern do not teach the label switching logic further comprises return path allocation logic operably coupled to allocate a return path label for a label switched path segment from the next hop device in the communication network, and wherein the request message transmitting logic is operably coupled to transmit to the next hop device in the communication network the second Next Hop Resolution Protocol request message including the return path label in addition to the label request and the virtual private network indicator.

147. Armitage teaches the label switching logic further comprises return path allocation logic operably coupled to allocate a return path label for a label switched path segment from the next hop device in the communication network, and wherein the request message transmitting logic is operably coupled to transmit to the next hop device in the communication network the second Next Hop Resolution Protocol request message including the return path label in addition to the label request and the virtual private network indicator (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of

Halpern and Liu, because it is an essential step in establishing the handshake needed for network communication.

148. As per claim 31, Liu nor Halpern teach the label switching logic comprises:

149. receiving logic operably coupled to receive from a previous hop device in the communication network a Next Hop Resolution Protocol request message including a label request and the virtual private network identifier;

150. forward path label allocation logic operably coupled to allocate a forward path label for a label switched path segment from the previous hop device in the communication network; and,

151. transmitting logic operably coupled to transmit to the previous hop device in the communication network a Next Hop Resolution Protocol reply message including the forward path label and the virtual private network identifier.

152. Armitage teaches the label switching logic comprises:

153. receiving logic operably coupled to receive from a previous hop device in the communication network a Next Hop Resolution Protocol request message including a label request and the virtual private network identifier (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54);

154. forward path label allocation logic operably coupled to allocate a forward path label for a label switched path segment from the previous hop device in the communication network (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54); and,

155. transmitting logic operably coupled to transmit to the previous hop device in the communication network a Next Hop Resolution Protocol reply message including the forward path label and the virtual private network identifier (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Halpern and Liu, because it is an essential step in establishing the handshake needed for network communication.

156. As per claim 32, Liu and Halpern do not teach the Next Hop Resolution Protocol request message includes a forward path address list, and wherein the transmitting logic is operably coupled to include the forward path address list as a return path address list in the Next Hop Resolution Protocol reply message.

157. Armitage teaches the Next Hop Resolution Protocol request message includes a forward path address list, and wherein the transmitting logic is operably coupled to include the forward path address list as a return path address list in the Next Hop Resolution Protocol reply message (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Halpern and Liu, because it is an essential step in establishing the connection needed for network communication.

158. Regarding claim 33, Liu and Halpern do not teach the Next Hop Resolution Protocol request message includes a return path label for a label switched path segment to the previous

hop device in the communication network, and wherein the label switching logic is operably coupled to establish the label switched path to the previous hope device in the communication network using the return path label.

159. Armitage teaches the Next Hop Resolution Protocol request message includes a return path label for a label switched path segment to the previous hop device in the communication network, and wherein the label switching logic is operably coupled to establish the label switched path to the previous hope device in the communication network using the return path label (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the communication method of Armitage with the system of Halpern and Liu, because it is an essential step in establishing the connection needed for network communication.

160. With regards to claim 34, Liu nor Halpern teach the Next Hop Resolution Protocol request messages comprise Next Hop Resolution Protocol Resolution Request messages.

161. Armitage teaches the Next Hop Resolution Protocol request messages comprise Next Hop Resolution Protocol Resolution Request messages (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the request messages of Armitage with the system of Halpern and Liu, because it is a necessity in finding a viable path through a communication network.

162. As per claim 35, Liu and Halpern do not teach the Next Hop Resolution Protocol reply messages comprise one of:

163. Next Hop Resolution Protocol Resolution Reply messages; and,

164. Next Hop Resolution Protocol Label Mapping messages.

165. Armitage teaches the Next Hop Resolution Protocol reply messages comprise one of:

166. Next Hop Resolution Protocol Resolution Reply messages (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54); and,

167. Next Hop Resolution Protocol Label Mapping messages (Figures 9D, 10, & 11; column 6, line 32 to column 7, line 54). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include the request messages of Armitage with the system of Halpern and Liu, because it is a necessity in finding a viable path through a communication network.

168. Claims 38 through 52 are rejected for similar reasons stated above.

169. Claims 56 through 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Armitage in view of Liu.

170. As per claim 56, Armitage teaches a protocol message comprising:

171. label information relating to a label switched path associated with the virtual private network (Figures 1, 2, 3, 4, 5, & 6; Abstract; column 7, line 55 to column 8, line 32).

172. Armitage does not teach a virtual private network identifier identifying a virtual private network for the protocol message.

173. Liu teaches a virtual private network identifier identifying a virtual private network for the protocol message (Figures 1, 2, 3, 6, 8, & 9; column 7, lines 8-40; column 9, lines 28-58). It

would be obvious to one with ordinary skill in the art at the time the invention was made to include the VPN identifier of Liu with the protocol message of Armitage, because it would ensure that the packet did not stray and go to another network.

174. Regarding claim 57, Armitage teaches that it is embodied as a next hop resolution protocol message (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54).

175. With regards to claim 58, Armitage teaches wherein the label information comprises label request information (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54).

176. As per claim 59, Armitage teaches wherein the label information comprises label mapping information (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54).

177. As per claim 60, Armitage teaches that it is embodied in a carrier wave for transmission over a communication network (Figures 2, 3, 4, 9D, 10, & 11; column 2, line 60 to column 3, line 15; column 6, line 32 to column 7, line 54).

Conclusion

178. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

179. The following patents are cited to further show the state of the art with respect to label switched paths in a VPN setting, such as:

United States Patent No. 6,081,524 to Chase et al., which is cited to show a label switched path in a VPN network.

180. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian La Forgia whose telephone number is (703) 305-7704. The examiner can normally be reached on Monday thru Thursday 7-5.

181. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh can be reached on (703) 305-9648. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7240 for regular communications and (703) 746-7239 for After Final communications.

182. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Christian La Forgia
Patent Examiner
Art Unit 2155

clf
February 11, 2003

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